mean altitude of from 2000 to 3000 feet above the sea, the central uplands, including the Atlantic slopes of the Nicaraguan backbone, enjoy a relatively mild climate, generally healthy and suited for European settlement." Of Costa Rica, "probably 275,000, out of a total population of 294,000, have already been fused in a somewhat homogeneous Ladino element of Spanish speech and culture. As in Salvador and Nicaragua, the people are concentrated in the fertile and salubrious volcanic districts on the Pacific slope." Mr. Keane's description of the principal West Indian islands is admirable and varied, and enables the reader to understand their importance in the general movement of the world; but the voluminous publications of the United States Government, in 1900, relative to Cuba and Puertorico, might have been consulted with advantage. Saving the defect that much of the industrial, financial and commercial data are not brought up to date, the volume is an extremely useful and instructive compendium of the subjects of which it treats, and does great credit both to the publisher and the author. One of the illustrations is reproduced on the preceding page. GEORGE EARL CHURCH.

THE MALDIVE AND LACCADIVE ARCHIPELAGOES.[1]

FEW oceanic island groups are of greater interest to the students of the science of "distribution" than the Laccadives, Maldives, Chagos and Seychelles, since they appear to be the last remnants of a land connection between India and Madagascar. For instance, Dr. W. T. Blanford, in his presidential address to the Geological Society for 1890, after mentioning that there appeared to be evidence of deep water between the banks on which the above-mentioned islands are situated, proceeded to say that he believed a fuller knowledge of the contours would reveal the existence of a bank connecting the whole series from India to Madagascar. "Even should this not be case, the evidence of a land-connection appears so strong that it may be a question whether the whole of the ocean-bottom between Africa and India may not have sunk to its present depth since Cretaceous times."

In addition to this special point of interest, the coral-reefs of the Maldives, Laccadives and Ceylon have an interest of their own in regard to their mode of formation and growth, the fauna by which they are inhabited, and the evidence they afford either of upheaval or of subsidence in this part of the Indian Ocean. The managers of the Balfour studentship, with the assistance of donations from the Government Grant Committee of the Royal Society and the British Association, were therefore well advised in selecting this area as one where a careful and detailed geographical and zoological survey would be likely to yield results of the highest scientific importance. So far as can be judged from the small section of the work now before us, Mr. Gardiner, ably seconded by Messrs. Borradaile and Cooper, appears to have carried out his task with great thoroughness and success. A part of the time, it is true, he was incapacitated from work by illness, but during his absence the researches were carried on with vigour by Mr. Cooper, who took no less than eighty-eight dredgings in five different atolls.

[1] "The Fauna and Geography of the Maldive and Laccadive Archipelagoes, being the account of the work carried on and of the collections made by an expedition during the years 1899 and 1900." Edited by J. S. Gardiner. Vol. i., part i. (Cambridge: University Press, 1901.)

Until the appearance of the complete work, which we gather will run to at least two volumes, we cannot, of course, lay before our readers the editor's conclusions with regard to the important problem mentioned at the commencement of this article. Neither can we refer to the general *facies* of the fauna of these islands. Our notice must accordingly be restricted to the general introduction to the work and the four chapters which (together with a description of certain sections of the fauna) constitute the part before us.

For reasons connected with the meteorological conditions prevailing in the Indian Ocean, it was decided to devote the summer of 1899 to a thorough survey of Minikoi, the most southern atoll of the Laccadives. This island forms the subject of two out of the four chapters already published, and its history is to be continued in those which follow.

In the introduction, Mr. Gardiner refers to the enormous numbers of the delicate shells of the cephalopod Spirula met with on the northern end of one island. On inquiry from the natives he found that they were quite familiar with the complete mollusc, which appeared in numbers during the winter of 1897. Strangely enough, however, the creature seems to be extremely local, since it is quite unknown to any of the other islanders.

In the chapter on its coral islands, the author remarks that the Indian Ocean gives little clue from its topography to the character of the foundations of the various groups; and in this respect is unlike the Pacific, where the groups run more or less nearly parallel to one another and to the adjacent continent. In one respect the two oceans present a striking similarity, namely, in the absence or paucity of coral-islands on their eastern[1] sides. In the Pacific this absence is complete; in the Indian Ocean it is broken only by Cocos-Keeling and Christmas Islands. In the Indian Ocean this scarcity of islands on the eastern border is, so far as it goes, in favour of the view that the numerous islands on the western side formed part of a land-connection. This belt between Madagascar and India is cut, says the author, to a depth of more than 2000 fathoms in three places, to wit, between the Maldives and Chagos, between the latter and Saya de Malha Bank, and again between Farquhar Atoll and Madagascar. "These channels divide the coral-reef areas into four sections, which may be respectively termed the Malagasy, Seychelles, Chagos and Maldive." These four sections are then discussed in detail.

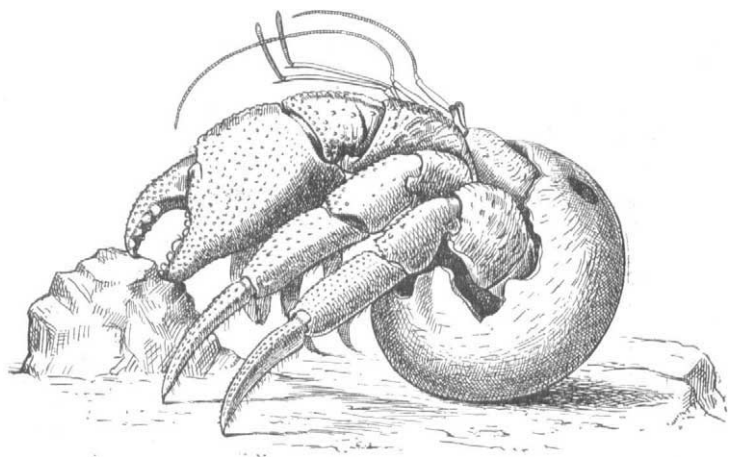

FIG. 1.—*Coenobita clypeatus* using a broken cocoanut as shell.

Chapters iii. and iv. are devoted to part of the descrip-

[1] The author writes "western," but he obviously means "eastern."

tion of Minikoi, of which a map is given. Although at one point the land is gaining on the lagoon, in others it is gradually diminishing, and the author prophesies that in course of time the sea will make a clean sweep of some parts of the atoll.

Much attention is devoted to the mode of formation of a coral conglomerate found in Minikoi and elsewhere at the base of the outer beach. From the presence of this conglomerate and other evidence, the author concludes that an elevation of at least 24 feet must be admitted to have taken place in Minikoi, and this during the time that it has existed as an atoll. "The presence of conglomerate masses," he adds, "I can only regard as indicating the existence of former land in any position where they now occur. The land there must have at one time extended round the whole island with only a single break, perhaps to the north, with lower parts here and there, where boat-channels across the reef now exist." Minikoi was indeed once apparently very like some of the low coral-islands of the Maldive group in the Indian Ocean and the Ellice group in the Pacific. For the final chapters on Minikoi we must await another fasciculus of the work.

The groups of the Minikoi fauna included in this fasciculus comprise the Hymenoptera, by Mr. P. Cameron; the land crustaceans, by Mr. L. A. Borradaile; and the nemertean worms, by Mr. R. C. Punnett. Among the second of these perhaps the most generally interesting group are the land hermit-crabs of the genus Cœnobita. Like the great cocoanut crab (*Birgus latro*), these crabs have forsaken the sea for a life on land, although (unlike the former) they still retain the habit of sheltering the abdomen within a shell or some such covering. In the case of a specimen of which the figure is here reproduced, the abdomen is encased in the broken shell of a cocoanut. Among the nemertean worms, a genus hitherto known only from Amboina has been met with again at Minikoi. R. L.

PROF. MAXWELL SIMPSON, F.R.S.

MAXWELL SIMPSON, ninth and youngest child of the late Thomas Simpson, was born at Beech Hill, co. Armagh, Ireland, on March 15, 1815. Educated at a private school in Newry, he thence proceeded to Trinity College, Dublin, where he took his Arts degree, and subsequently entered the School of Medicine. In 1847 he graduated as Bachelor of Medicine in Trinity College; but already he had been strongly attracted towards the study of chemistry, and instead of settling down to the practice of physic, he now became associated, as lecturer in chemistry, with the medical school of Park Street, Dublin. This school had been established about 1824 by a number of physicians and surgeons, and had included among its teachers James Apjohn, subsequently professor of chemistry in the University of Dublin. From Park Street he was transferred to the Peter Street School of Medicine, where he remained for a few years.

Inspired, however, by a profound love for science, the limitations incidental to such a post grew irksome to him; the desire to secure adequate outlet for his intellectual energies, to prosecute his own inquiries, and to enjoy the communion of fellow-workers intensified with time, until finally, casting aside all material considerations, he relinquished his teaching and proceeded to the Continent, where, associated with some of the most eminent chemists of the day, he was free to breathe the congenial atmosphere of research.

Plunging with characteristic energy and enthusiasm into work, he soon became productive. In 1851 he studied with Kolbe at Marburg, then under Bunsen at Heidelberg, conducting in the laboratory of the latter an investigation on which his first original paper was based; this communication, "On two new Methods for the Determination of Nitrogen in Organic and Inorganic Compounds," published in the *Journal* of the Chemical Society (vi. 289) and in the *Annalen der Chemie und Pharmacie* (xcv. 63), foreshadowed the accuracy and thoroughness which were to mark his later work.

Moving next to Paris, and entering the laboratory of Wurtz, his attention naturally became centred on organic chemistry, and here his capacity for work was quickly manifested; commencing with a paper on the "Action du Brome sur l'Iodure d'Aldéhydène," read before the Académie des Sciences on March 1, 1858, one memoir followed another in rapid succession. In April he made a communication "Sur une Base nouvelle obtenue par l'action de l'Ammoniaque sur le Tribromure d'Allyle," another on the same subject in August, and a third in November on the "Action du Chlorure d'Acétyle sur l'Aldéhyde"; these he followed up by two papers (*Proc.* Roy. Soc., ix. 725 and x. 114) "On the Action of Acids on Glycol." On April 25, 1861, Prof. Frankland communicated, on his behalf, to the Royal Society the first of two important papers "On the Synthesis of Succinic and Pyrotartaric Acids," in which he showed that the former, built up from ethylene, through the dibromide and corresponding cyanide, is identical with common succinic acid; the latter, from propylene bromide, with the pyrotartaric acid got by distilling natural tartaric acid—thereby establishing the chemical constitution of both. This excellent piece of work met with due recognition, and in 1862 Maxwell Simpson was admitted a Fellow of the Royal Society.

Two other communications appeared (*Proc.* Roy. Soc., xi. 590 and xii. 278) "On the Action of Chloride of Iodine on Iodide of Ethylene and Propylene Gas," and, almost concurrently with these, two more, now classical, "On the Synthesis of Tribasic Acids" (*ibid.* xii. 236, and *Journ.* Chem. Soc., 2, iii. 331); here it was shown that from allyl tribromide, a corresponding tricyanide can be obtained, which by saponification yields a salt of tricarballylic acid—this substance is an immediate derivative of glycerine, and "bears the same relation to citric acid that succinic bears to malic acid."

It is not possible within these limits of space adequately to notice Simpson's work or its bearing. Of his further papers may be mentioned: "On the Acids that may be derived from the Cyanides of the Oxy-radicals of the Di- and Tri-atomic Alcohols"; "On the direct Transformation of Iodide of Allyle into Iodide of Propyle"; "On the Action of Chloride of Iodine upon Organic Substances"; "On the Formation of Di-iodacetone"; "On the Formation of Succinic Acid from the Chloride of Ethylidene"; "On a new Compound formed by the direct union of Aldehyde and Anhydrous Prussic Acid" (with Dr. Gautier); "On the direct Transformation of Chlor-iodide of Ethylene into Glycol"; "On some new Derivatives of Acetone"; "On the Brom-iodides"; "On the Determination of Urea by means of Hypobromite of Soda" (with Mr. C. O'Keeffe), and a paper (*Proc.* Roy. Soc., xxvii. 120) "On compounds of Silver Iodide with Alkyl Iodides." Of the above work, that described in the paper on aldehydes and hydrocyanic acid is especially important, leading, as it did, to the synthetical production of one of the forms of lactic acid.

In 1872, Maxwell Simpson was appointed to the chair of chemistry in Queen's College, Cork, an office which he resigned after nineteen years of service.

His power was by no means confined to the research laboratory; as a lecturer he possessed in a high degree that gift of luminous exposition which is the product of quick and accurate memory, clear intelligence and ready command of language. Simple and unaffected, genial of manner, though strong in the courage of his convictions; direct and original in thought and speech, Simpson's